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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/001,499	11/14/2001	Ligui Zhou	0179.0029	3237

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W. Mark Bielawski
Hexcel Corporation
11711 Dublin Boulevard
Dublin, CA 94568

EXAMINER

MAKI, STEVEN D

ART UNIT	PAPER NUMBER
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1733

DATE MAILED: 01/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/001,499

Applicant(s)

ZHOU ET AL.

Examiner

Steven D. Maki

Art Unit

1733

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 October 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 and 8-38 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 8-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

Art Unit: 1733

1) A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10-24-05 has been entered.

2) The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3) **Claims 1-2, 8-11, 16-18, 21, 23-27, 30-32 and 35-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kishi et al (EP 819723, already of record) in view of Recker et al (EP 392348, cited in IDS filed 7-6-04).**

Kishi et al and Recker et al are applied as in paragraph 6 of the office action dated 11-1-04 (paragraph 6 of the office action dated 11-1-04 is incorporated herein by reference).

In the amendment filed 10-24-05, --wherein said fillet forming particles dissolve during curing of said prepreg resin-- was added to claims 1 and 17. This subject matter was addressed in the non-final office action dated 11-1-04. See description of Recker et al on page 5 of the office action dated 11-1-04. In particular, note the description of "wherein the solubility of the differentially soluble thermoplastic in the epoxy resin at the mix temperature is minimal while *the solubility at the cure temperature is both rapid and*

Art Unit: 1733

total (page 2 lines 1-5, page 3 lines 27-34, 48-54, page 4 lines 49-52" (underlined emphasis in original / italics emphasis in this office action). Also, note that the subject matter of "substantially dissolve said fillet forming particles" in claim 17 was specifically addressed at page 7 lines 6-10 of the office action dated 11-1-04.

4) Claims 29, 34 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kishi et al in view of Recker et al as applied above and further in view of Hayes (US 3530087).

Hayes is applied as in paragraph 7 of the office action dated 11-1-04 (paragraph 7 of the office action dated 11-1-04 is incorporated herein by reference).

5) Claims 3-5, 12-14 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kishi et al in view of Recker et al as applied above and further in view of Ghali et al (US 4945154) and optionally Portelli et al (US 5368922).

Ghali et al and the optional Portelli et al are applied as in paragraph 8 of the office action dated 11-1-04 (paragraph 8 of the office action dated 11-1-04 is incorporated herein by reference).

6) Claims 6, 15 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kishi et al in view of Recker et al and Ghali et al and optionally Portelli et al as applied above and further in view of Hayes et al.

Hayes et al is applied as in paragraph 9 of the office action dated 11-1-04 (paragraph 9 of the office action dated 11-1-04 is incorporated herein by reference).

7) Claims 9 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kishi et al in view of Recker et al as applied above and further in view of Maranci et al (US 4957801).

Maranci et al is applied as in paragraph 10 of the office action dated 11-1-04 (paragraph 10 of the office action dated 11-1-04 is incorporated herein by reference).

8) Claims 28, 33 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kishi et al in view of Recker et al as applied above and further in view of Japan '619 (JP 3-243619).

Japan 619 is applied as in paragraph 11 of the office action dated 11-1-04 (paragraph 11 of the office action dated 11-1-04 is incorporated herein by reference).

Remarks

9) Applicant's arguments filed 10-24-05 have been fully considered but they are not persuasive in view of (1) the examiner's remarks in the office action dated 6-2-05 (these remarks being incorporated herein by reference) and (2) the following remarks:

Applicant argues "Applicant's minimum resin viscosity is specifically measured at temperatures up to and including the curing temperature." (page 10 of the response filed 10-24-05) whereas "Kishi et al's minimum viscosity is measured only as the resin temperature is increased from 50°C to 80°C" (page 10 of response filed 10-24-05). This argument is not commensurate in scope with the claims and is therefore not persuasive. Claims 1 and 17 require "the minimum viscosity of said prepreg resin during curing thereof is between 150-1500 poise" instead of --the minimum viscosity of said prepreg resin at temperatures up to and including the curing temperature thereof is between

Art Unit: 1733

150-1500 poise--. The claimed "minimum viscosity of said prepreg resin during curing" reads on "the minimum value of resin viscosity during heating" as disclosed by Kishi et al; it being noted that (1) the minimum viscosity of the final mixture is same as the minimum viscosity during curing because dissolving of particles during curing increases (instead of decreases) viscosity (paragraph 22 of this application); (2) the specification describes a curing temperature range in example 1 as being 20°C to 177°C, (3) Kishi et al describes "Measuring temperature range: 50-150°C" and "Heating rate: 1.5°C/min" under "(Resin viscosity measuring conditions)" (page 12) and (4) Kishi et al describes "For curing, the sample was heated at 1.5°C/min upto 180°C" (page 10) . In short, "minimum viscosity of said prepreg resin during curing" reads on measuring viscosity at the temperatures disclosed by Kishi et al and is not limited to measuring the minimum viscosity over the entire range of 20-177°C (paragraph 43 of specification) or at the temperature of 177°C (paragraph 46 of specification).

Applicant argues that Kishi et al does not teach use of a dissolved thermoplastic viscosity control agent and thermoplastic particles that dissolve during curing. This argument is not persuasive since (1) **Kishi et al teaches use of soluble thermoplastic ("viscosity control agent") and thermoplastic particles for improving toughness** (page 2 lines 34-38, page 4 lines 25-34, page 5 lines 23-28, page 5 lines 29-34, page 6 lines 24-27, page 8 lines 27-29 and page 5 line 31, page 5 lines 44-49) and (2) **Recker et al teaches the use of soluble thermoplastic and thermoplastic particles that dissolve during curing for improving toughness** (e.g. abstract, page 5 lines 5-12).

Art Unit: 1733

Applicant argues that a soluble thermoplastic is used to control viscosity of the resin so that the resulting prepreg has suitable properties such as tack and drapability. This unexpected results argument is not persuasive since there is no evidence of record showing unexpected results of tack and drapability over Kishi et al, which teaches that the resulting prepreg is good in tackiness and drapability (abstract of Kishi et al).

Applicant argues: "... there is no teaching or suggestion to use thermoplastic particles to provide a gradual viscosity change during the curing process to enhance fillet formation with the added benefit of toughening the fillet resin" (page 10 of response filed 10-24-05, emphasis added). This unexpected results argument is not persuasive since there is no evidence of record showing unexpected results of enhanced fillet formation over Kishi et al. Kishi et al teaches using soluble thermoplastic ("thermoplastic viscosity control agent") to optimize viscosity so as to enhance fillet formation. See page 2 lines 34-38, page 4 lines 25-34, page 5 lines 23-28, page 5 lines 29-34, page 6 lines 24-27, page 8 lines 27-29 of Kishi et al. The examples in the specification are not compared with a comparative example using a composition having thermoplastic viscosity control agent but not fillet forming particles. All of the comparative examples have thermoplastic fillet forming particles. Furthermore, using thermoplastic particles which dissolve during curing to obtain the benefit of toughening the resin is the expected result in light of the teachings of Recker et al. See abstract of Recker et al.

Applicant argues that Recker et al does not provide any motivation to use differentially soluble thermoplastics to control viscosity during curing to enhance fillet

Art Unit: 1733

formation during bonding of a self adhesive prepreg to a honeycomb. This argument is not persuasive since (1) Recker et al and Kishi et al are directed to epoxy resin compositions for fiber reinforced prepregs for the aerospace industry and (2) Recker et al motivates one of ordinary skill in the art to add thermoplastic particles which dissolve during curing to Kishi et al's epoxy resin composition to significantly increase toughness.

Applicant comments that the only teaching regarding particles in Kishi et al is the use of silica and other insoluble particles that remain as particles throughout the curing process. In response, the examiner makes the following comments: First: Claims 1 and 17 fail to require the viscosity control agent to be in particle form. Second: Kishi et al teaches using soluble thermoplastic as additives [C] ("thermoplastic viscosity control agent") to optimize viscosity so as to enhance fillet formation. See page 2 lines 34-38, page 4 lines 25-34, page 5 lines 23-28, page 5 lines 29-34, page 6 lines 24-27, page 8 lines 27-29 of Kishi et al. Third: With respect to Kishi et al's teaching to use thermoplastic resin or silica for component [C], the "... case law does not require that a particular combination must be the preferred, or the most desirable, combination described in the prior art in order to provide motivation for the current invention." In re Fulton 73 USPQ2D 1141, 1145 (Fed. Cir. 2004).

Applicant argues that Recker et al provides no information on what happens to the resin viscosity as the resins are heated during cure and whether or not such resins would be suitable for use in a self adhesive prepreg where fillet formation is an important consideration. In response, the examiner makes the following comments:

Art Unit: 1733

First: There is no difference between the differentially soluble thermoplastic particles of Recker et al and the claimed thermoplastic fillet forming particles.

- (1) Both of these particles comprise thermoplastic such as polyethersulfone.
- (2) Both of these particles are not dissolved in the epoxy resin of the final resin mixture for the prepreg, but are dissolved during curing.
- (3) Both of these particles have a size in the micrometer range (2-35 micrometers in Recker et al and 1-100 micrometers in claim 21).
- (4) Both of these particles are for increasing toughness.

Second: There is a reasonable expectation of success for using Recker et al's differentially soluble thermoplastic particles in Kishi et al's epoxy resin composition for a prepreg since (1) Recker et al teaches using the differentially soluble thermoplastic particles in an epoxy resin composition for a prepreg, (2) Kishi et al teaches at page 8 lines 30-32, 44-49 that thermoplastic particles for improving toughness *may be added* to components [A], [B] and [C] and (3) Recker et al teaches that the differentially soluble thermoplastic particles, which *may be used in combination with* [A] (epoxy resin), [B] (curing agent) and [C] (soluble thermoplastic), significantly increases toughness of an epoxy resin system (abstract).

Applicant argues that Kishi et al and Recker et al are directed to significantly different endeavors within the general field of composites. The examiner disagrees since (1) Kishi et al and Recker et al are in the same field of endeavor of epoxy resin compositions for fiber reinforced prepreps for the aerospace industry, (2) Kishi et al and Recker et al both teach using soluble thermoplastic in the epoxy resin composition and (3) Kishi et al and Recker et al both teach using organic thermoplastic particles to

Art Unit: 1733

improve toughness. The suggestion to use differentially soluble thermoplastic particles (particles that dissolve during curing) as the particles for improving toughness comes from Recker et al. With respect to Kishi et al's teaching that the prepreg for the honeycomb is "good in tackiness and drapability" (abstract of Kishi et al), Recker et al discloses adding the differentially soluble thermoplastic particles to an epoxy resin system displaying "adequate tack and drape" (page 8 line 32 of Recker et al).

10) No claim is allowed.

11) All claims are drawn to the same invention claimed in the application prior to the entry of the submission under 37 CFR 1.114 and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the application prior to entry under 37 CFR 1.114. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action after the filing of a request for continued examination and the submission under 37 CFR 1.114. See MPEP § 706.07(b).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Art Unit: 1733

12) Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven D. Maki whose telephone number is (571) 272-1221. The examiner can normally be reached on Mon. - Fri. 8:30 AM - 5:00 PM.

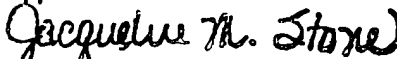
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino can be reached on (571) 272-1226. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Steven D. Maki
January 5, 2006


STEVEN D. MAKI
PRIMARY EXAMINER 1-5-06

Approved



Jacqueline M. Stone, Director
Technology Center 1700